



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

m.f.

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,563	11/27/2001	Yong Sung Ham	8734.023.00-US	7444
30827	7590	10/02/2006	EXAMINER	
MCKENNA LONG & ALDRIDGE LLP 1900 K STREET, NW WASHINGTON, DC 20006			BECK, ALEXANDER S	
			ART UNIT	PAPER NUMBER
			2629	

DATE MAILED: 10/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/993,563

Applicant(s)

HAM, YONG SUNG

Examiner

Alexander S. Beck

Art Unit

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11, 15, 16, 18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15, 16, 18 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Request for Continued Examination*

1. Acknowledgment is made of the Request for Continued Examination filed by the Applicant on June 26, 2006, in which: independent Claims 1,5 and 9 are amended; and Claims 14,17 and 19 are cancelled. **Claims 1-11,15,16,18 and 20 are currently pending in U.S. Application Serial No. 09/993,563, and an Office Action on the merits follows.**

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-7,15,16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Publication No. 2001/0038372 A1, hereinafter LEE) in view of Hirose et al. (U.S. Patent No. 5,123,059, hereinafter HIROSAWA).**

As to independent **Claims 1 and 5**, LEE teaches/suggests in **Figure 14** a method and apparatus for driving a liquid crystal display, comprising: dividing input data into most significant bit data and least significant bit data; a memory (420) receiving most significant bits of data for an  $n^{\text{th}}$  frame from an input line and outputting the most significant bits of data for an  $(n-1)^{\text{th}}$  frame (e.g., delaying the most significant bit data for one frame period); and a modulator (460) modulating the most significant bits of data of the  $n^{\text{th}}$  frame (e.g., current most significant bit

Art Unit: 2629

data) in accordance with a difference between the most significant bits of data for the  $(n-1)^{\text{th}}$  frame (e.g., delayed most significant bit data) and the most significant bits of data for the  $n^{\text{th}}$  frame (LEE: page 4, paragraph [0078]; page 7, paragraph [0122]).

As can be seen in **Figure 14**, a look-up table (**462**) receives  $n$ -bits of the most significant bit data of the current frame (**Gm**) and of the previous frame (**Gm-1**) which then outputs a value to a comparator (**464**), along with the most significant bit data of the current and previous frame, which subsequently outputs modulated most significant bit data of  $n$ -bits (LEE: page 8, paragraphs [00138-0141]).

LEE does not disclose expressly wherein the modulated most significant bits of data contain more data bits than do each of the most significant bits of data for the  $(n-1)^{\text{th}}$  frame and the most significant bits of data for the  $n^{\text{th}}$  frame.

HIROSAWA, analogous in art with LEE, teaches/suggests a method of driving a liquid crystal display in **Figure 5** wherein input data of  $m$ -bits is received by a system comprising a look-up table (**LUT**) and comparator (**11**), the look-up table modulating the input data of  $m$ -bits and outputting modulated data of  $n$ -bits, wherein  $n$  is greater than  $m$  ( $n > m$ ) (HIROSAWA: column 5, lines 20-30). This is accomplished by increasing the number of bits of the look-up table and of the comparing means (HIROSAWA: column 6, lines 22-26).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of LEE such that the number of bits of the look-up table and of the comparing means was increased, as taught/suggested by HIROSAWA. As a result, the modulated current most significant bit data (e.g., output bit data) containing more data bits than do each of the most significant bits of data for the  $(n-1)^{\text{th}}$  frame and the most significant bits of data for the  $n^{\text{th}}$  frame (e.g., input bit data).

Art Unit: 2629

The suggestion/motivation for doing so would have been to improve the precision of the data to be displayed (HIROSAWA: column 6, lines 22-26).

As to **Claims 2 and 6**, LEE as modified by HIROSAWA above teaches/suggests wherein the input data is 8 bits wide, the most significant bits of data and the least significant bits of data from the input line are each n-bits wide, wherein a skilled person in the art can change the number of n (LEE: page 6, paragraph [0016]), and the modulated current most significant bit data is m-bits wide, wherein  $m > 4$  (i.e.,  $m > \text{input}$ ) (HIROSAWA: column 5, lines 20-30).

Although neither LEE nor HIROSAWA disclose expressly  $n=4$  and  $m=8$ , the Examiner takes Official Notice that the utilization of data bit widths in powers of 2 ( $2^1=2$ ,  $2^2=4$ ,  $2^3=8$ , etc.) is old and well-known in the art.

Thus, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to further modify the teachings of LEE and HIROSAWA such that  $n=4$  and  $m=8$ .

The suggestion/motivation for doing so would have been because computer-processing systems are known to operate with data bit widths in powers of 2.

As to **Claim 3**, LEE teaches/suggests combining the current least significant bit data and the modulated current most significant bit data to generate an output video data (LEE: page 5, paragraph [0102]).

As to **Claim 4**, LEE teaches/suggests wherein the modulating of the current most significant bit data comprises, selecting desirable data from a look-up table based on the current

Art Unit: 2629

most significant bit data and the delayed most significant bit data; and outputting the selected data as the modulated current most significant bit data (LEE: page 5, paragraphs [0096,0097]).

As to **Claim 7**, LEE teaches/suggests wherein the modulator includes a look-up table having available gray level values for the modulated most significant bits of data (LEE: page 5, paragraph [0086]).

As to **Claim 15**, LEE teaches/suggests in **Figure 8** wherein the liquid crystal display comprises a liquid crystal display panel having a plurality of data lines, and driving the data lines with the output video data (LEE: page 4, paragraphs [0074-0079]).

As to **Claims 16 and 18**, LEE teaches/suggests in **Figure 10** wherein the look-up table stores available gray level values of the modulated current most significant bit data based on the available gray level values of the current most significant bit data and the available gray level values of the delayed most significant bit data (LEE: page 5, paragraph [0090-0093]).

**4. Claims 8-11 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Publication No. 2001/0038372 A1) and Hirose et al. (U.S. Patent No. 5,123,059) as applied to Claims 1-7,15,16 and 18 above, and further in view of Okuzono et al. (U.S. Publication No. 2001/0043178 A1, hereinafter OKUZONO).**

As to independent **Claim 9**, most of the claim limitations have already been discussed and met by references LEE and HIROSAWA, as detailed in the above paragraphs regarding Claims 1,5 and 15, with the exception of: a timing controller rearranging video data received

Art Unit: 2629

from an input data and outputting RGB data and first and second timing signals, a data driver receiving the first timing signal, and a gate driver receiving the second timing signal.

Neither LEE nor HIROSAWA disclose expressly a timing controller rearranging video data received from an input data and outputting RGB data and first and second timing signals, a data driver receiving the first timing signal, and a gate driver receiving the second timing signal.

OKUZONO, analogous in art with LEE and HIROSAWA, teaches/suggests a display apparatus in **Figure 1** with a timing controller (8), which supplies video data to the input line (**DATA**). The timing controller further controls the data driver (**DCK**) and the gate driver (**VCK**). Here the "source driver" is understood to be the data driver. OKUZONO describes the first (**DCK**) and second (**VCK**) clock signals and the function of the timing controller to ultimately "control the image display panel on the liquid crystal display" (OKUZONO: page 4, paragraph [0051]). It is understood that the data output from the timing controller is RGB data because OKUZONO discloses that the liquid crystal display may be provided with "a color filter for the three primary colors RGB" (OKUZONO: page 4, paragraph 0048)).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to further modify the teachings of LEE and HIROSAWA such that a timing controller was included, as taught/suggested by OKUZONO.

The suggestion/motivation for doing so would have been to control the image display on the liquid crystal panel, and it is a conventional standard to include timing devices (e.g., clocks, etc.) to control data flow in a device.

As to **Claim 8**, all of the claim limitations have already been discussed and met by references LEE and OKUZONO, as detailed in the above paragraphs regarding Claims 9 and 15.

As to **Claim 10**, all of the claim limitations have already been discussed and met by references LEE, HIROSAWA and OKUZONO, as detailed in the above paragraphs regarding Claims 5, 16 and 18, wherein the data is RGB (OKUZONO: page 4, paragraph 0048]).

As to **Claim 11**, all of the claim limitations have already been discussed and met by references LEE, HIROSAWA and OKUZONO, as detailed in the above paragraphs regarding Claims 2 and 6, wherein the data is RGB (OKUZONO: page 4, paragraph 0048]).

As to **Claim 20**, all of the claim limitations have already been discussed and met by references LEE, HIROSAWA and OKUZONO, as detailed in the above paragraphs regarding Claims 16 and 18, wherein the data is RGB (OKUZONO: page 4, paragraph 0048]).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander S. Beck whose telephone number is **(571) 272-7765**. The examiner can normally be reached on M-F, 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Sumati Lefkowitz** can be reached on **(571) 272-3638**. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.



Art Unit: 2629

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

asb  
9/20/06



**SUMATI LEFKOWITZ**  
SUPERVISORY PATENT EXAMINER